

## **Creating a Virtual International Environmental Research Institute: Developing Communities of Learners to Sustain Healthy Rivers**

**(Preliminary draft version)**

Rivers represent vital lifelines throughout the world. They support the people, flora and fauna along their paths, as well as provide a means of transportation, connections that provide a means to share goods, services and knowledge. These rivers often have historical, cultural and spiritual significance in the countries through which they flow.

Yet at the same time, these rivers struggle to survive, as we face the tension between economic development and environmental protection. The health of our rivers has direct and indirect impact on the health of the people and the environment that they touch. There is a critical need to join together interdisciplinary, international and community teams to embark upon the research and methods to improve and sustain the health of our rivers worldwide. We need to engage future generations in this effort, teaching them the importance of our rivers, the environment and the methods to preserve them.

The emergence of information technologies such as the Internet, the Web, and videoconferencing is creating new ways of sharing knowledge and working collaboratively independent of time and distance. For example, Telehealth uses these information technologies to improve access to health care, education and knowledge sharing. These health information technologies are aimed at providing quality care to the underserved and remote regions throughout the world; the integration of telecommunications systems into the practice of protecting and promoting health. Telehealth covers education for health, public and community health, health systems development and epidemiology. Applying these tools to address the health of the rivers and environment is closely interwoven with the health of the public and individuals. Information technologies also provide a platform for collaboration; “virtual collaboratories” for research, planning, education and clinical service. They create “electronic trade routes” over which we can share information effectively and efficiently, as well as improve cross-cultural understanding.

An example of a successful program addressing these environmental issues is the University of New Mexico Bosque Ecosystem Monitoring Project (UNM BEMP) based in Albuquerque, New Mexico, along the Rio Grande. This project is a collaborative effort between the University, Bosque School and the Albuquerque Public Schools. The program engages middle and high school students, along with university and school faculty, in developing projects related to determining the health of the river and surrounding bosque along its shores. The program provides a foundation for “project-based learning” through which students learn important basic scientific and research principles by making the learning relevant in association with monitoring the environment and mentoring by school teachers, along with university students and faculty. These “learning families” also create an environment for engaging the next generations of scientists, technologists, engineers and mathematicians through interactive, experiential learning, that is, making learning fun and exciting though direct

application in the field and laboratory. From that effort, the Albert Black Bosque Institute was formed through a generous donation from the Black family. This Institute provides an important laboratory for research at Bosque School and the beginning of a bosque-specific “exploratorium”.

We propose to use this program as a model for developing a virtual international environmental research institute in which the emerging information technologies, such as those used for telehealth, can be applied to creating a network with other international communities with similar interests. Through this initiative we can collaboratively link interdisciplinary faculty, teachers and students at many educational levels in the research and development critically needed to find the best solutions to enhance the health of the rivers touching these communities, as well as the people in those regions. Furthermore, these “electronic links” can allow students and teachers to work together independent of distance and allow cross-cultural exchange that should improve our understanding of areas of global convergence and, at the same time, unique differences.

Specifically, using information technologies such as the Web and videoconferencing, we propose to link the communities of Albuquerque, New Mexico, USA with Kathmandu, Nepal and Quito, Ecuador where there is mutual interest in collaboration related to the rivers in their area; the Rio Grande in New Mexico, the River Bagmati (for example) in Nepal, and the Rio Napo in Ecuador. The linkages would include the public and independent schools in each area, along with interested universities. This would represent an expanded model of the UNM BEMP program between UNM, Bosque School and Albuquerque Public Schools. Students (primarily middle school, high school, along with some undergraduate and graduate) would develop projects along with teachers and faculty to address specific environment and health issues (through, e.g., telemedicine) affecting their regions and associated rivers and use the information technologies to share experiences and develop projects.

Such a community can also be made more vibrant and economically sustainable through the promotion of micro financing. (For details, see [http://nepalstudycenter.unm.edu/P2PMicroFinance\\_Kiva.htm](http://nepalstudycenter.unm.edu/P2PMicroFinance_Kiva.htm)). Development after all is meaningful and can be sustained when different components of it work in an interactive and integrated fashion.

We believe this virtual collaboratory will allow significant international cross-cultural exchange, as well as engage students in science, technology, engineering and math (STEM) principles as part of broad-based “learning families” and project teams. In addition, we anticipate exchange of information and projects involving the arts, history, religion, political science, economics and many other disciplines, providing a foundation for global understanding in a shrinking world. The model could eventually be expanded to include many other countries with similar interests to create a truly international environmental research institute.

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